

SERVICE MANUAL

VOX VT20+

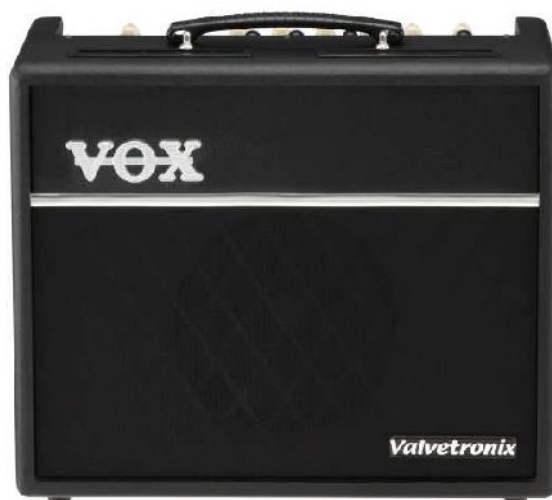


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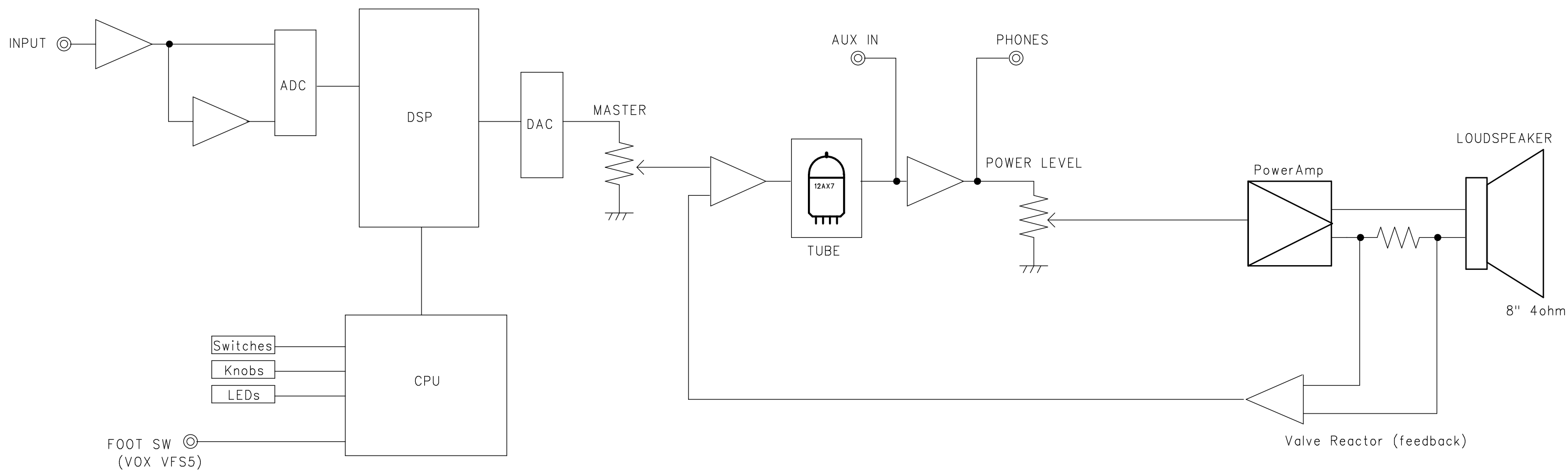
VT20+

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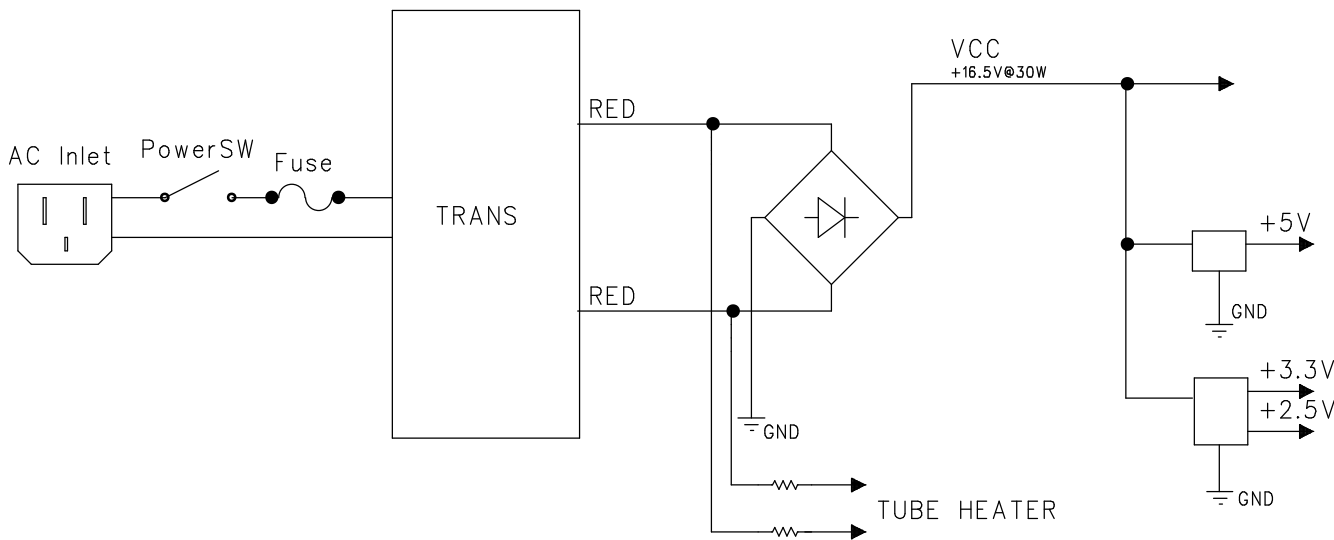


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Ver.1.0
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VOX VT20+
BlockDiagram

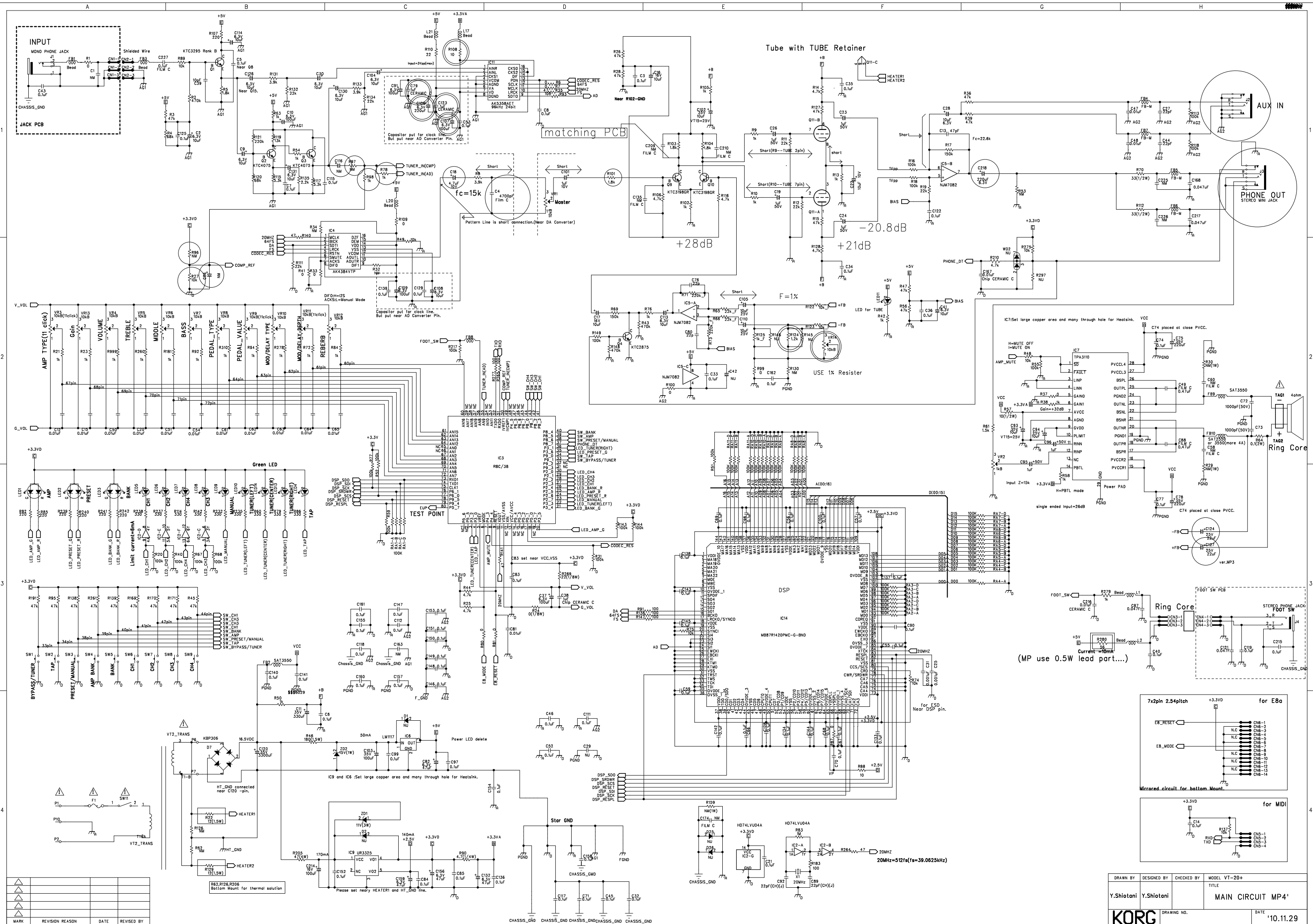


POWER SUPPLY



△			
△			
△			
△			
△			
MARK	REVISION REASON	DATE	REVISED BY

DRAWN BY	DESIGNED BY	CHECKED BY	MODEL	VOX VT20+
Y.SHOTANI			TITLE	BlockDiagram
KORG			DRAWING NO.	DATE
				15.Nov,2010

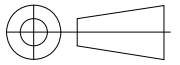


MARK	REVISION	REASON	DATE	REVISED BY

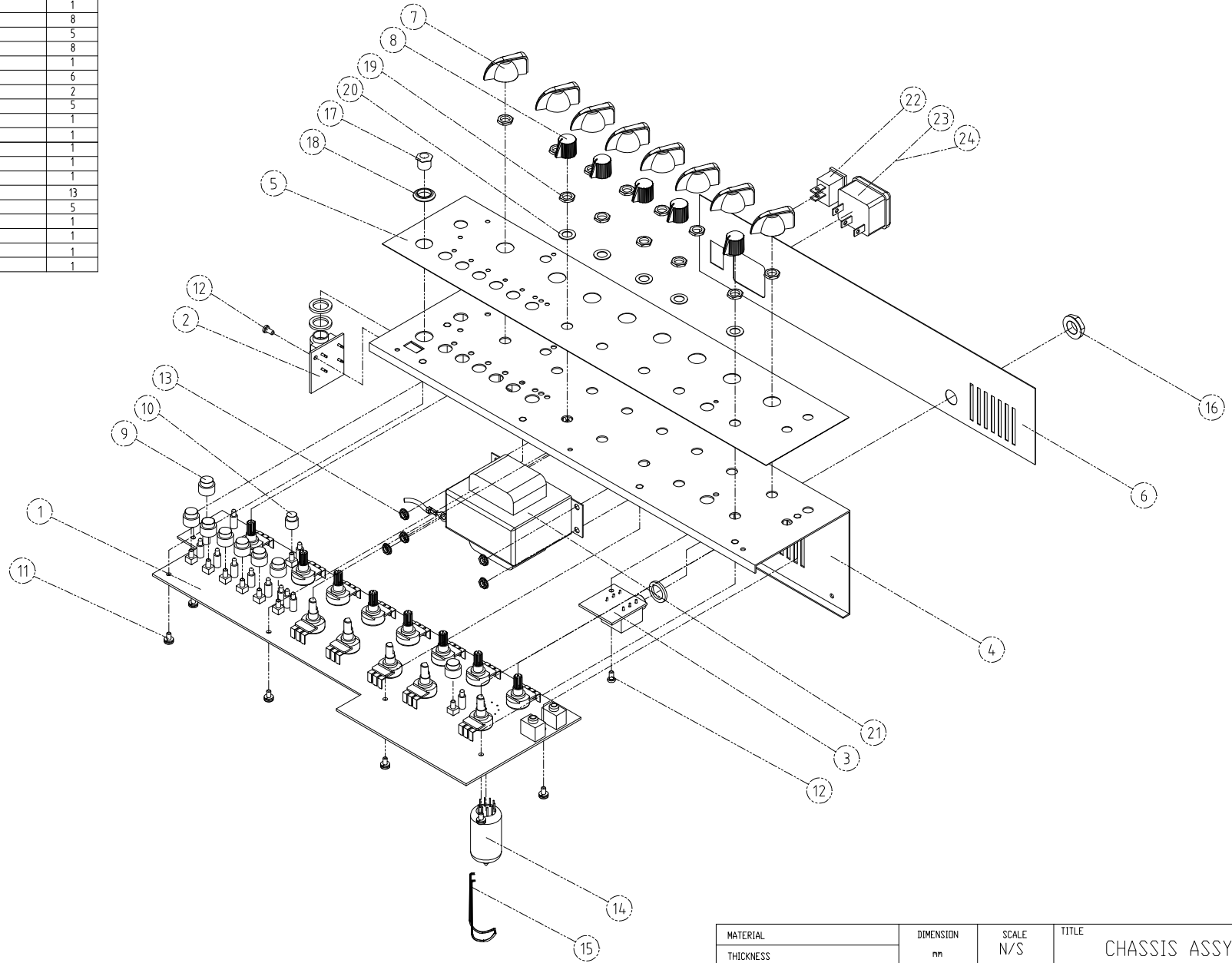
DRAWN BY	DESIGNED BY	CHECKED BY	MODEL	VT-20+
Y.Shitani	Y.Shitani		TITLE	MAIN CIRCUIT MP4'
KORG			DRAWING NO.	
			DATE	'10.11.29

DWG.NO. ASSY0290-01


NO	DESCRIPTION	SPECIFICATION	Q'TY
1	MAIN PCB ASS'Y	VT20+	1
2	JACK PCB ASS'Y	VT20+	1
3	FOOT S/W PCB ASS'Y	VT20+	1
4	MAIN CHASSIS	386X90X95 EGI 1t	1
5	FRONT PANEL	PVC 0.5t 376X80 HAIRLINE BLACK	1
6	REAR PANEL	PS 0.5t 336X66 BLACK	1
7	VOLUME KNOB	ABS CREAM(CHIKENHEAD)	8
8	VOLUME KNOB-SMALL	ABS BLACK(KNOB0050)	5
9	TACK KNOB "A"	NBR Ø9	8
10	TACK KNOB "B"	NBR Ø7	1
11	SCREW	MBSSW 3X6 NI	6
12	SCREW	TPQS 3X6 NI	2
13	FRANGE NUT	M4 NI	5
14	TUBE	12AX7ACS	1
15	TUBE RETAINER	12AX7B (SPR0012)	1
16	JACK NUT	ABS BK	1
17	JACK NUT	CR(BPJ)	1
18	JACK WASHER	ABS BK(BPJ)	1
19	VOLUME NUT	M7 NI	13
20	VOLUME WASHER	Ø7 NI	5
21	TRANS	VT20+	1
22	POWER SWITCH	RL3-421-H-0-BK	1
23	INLET	SC-8F-21	1
24	FUSE		1



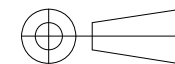
THIRD ANGLE PROJECTION



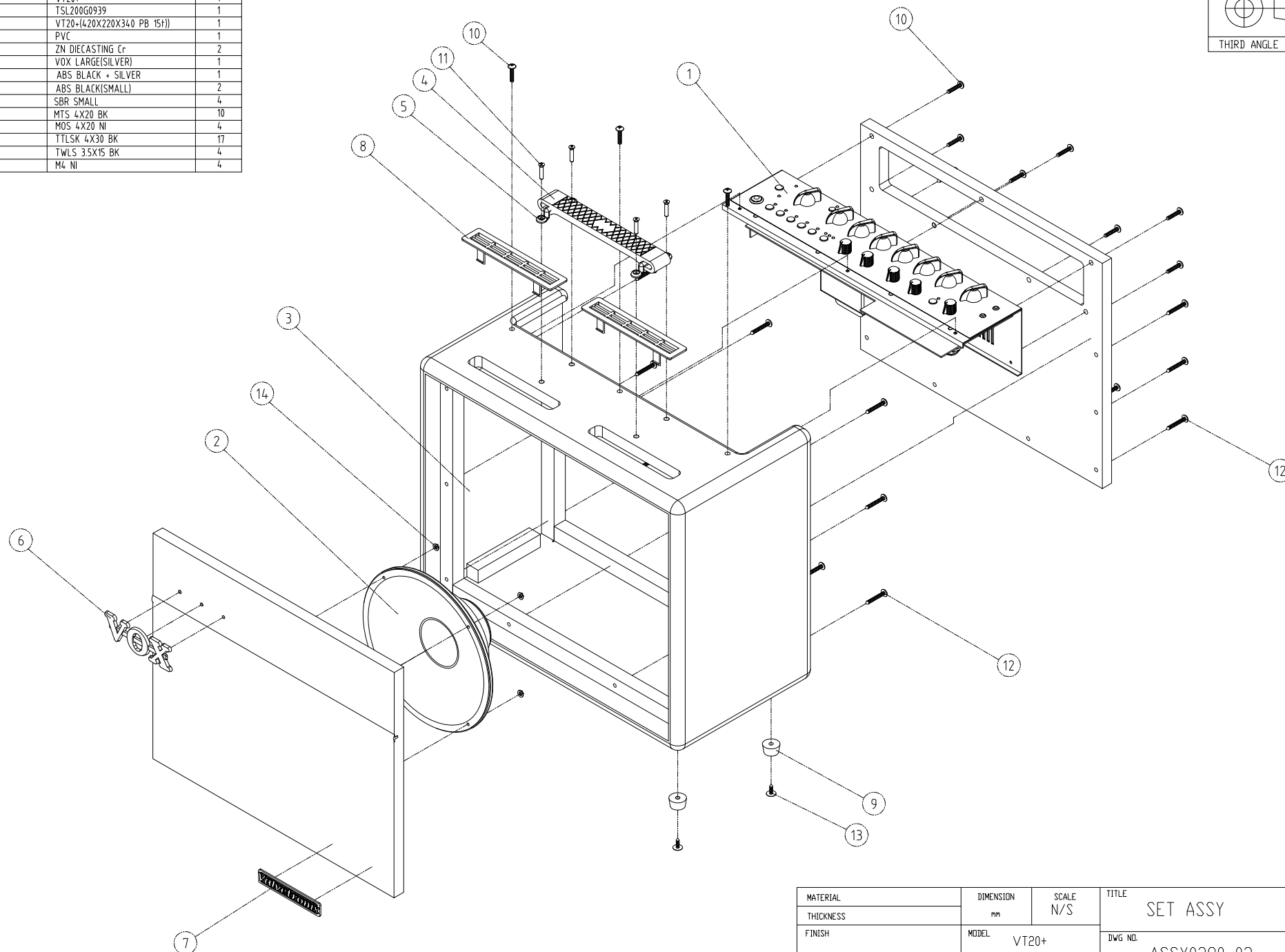
REV. NO.	REV. DATE	DESCRIPTIONS OF REVISION
C		
B		
A		

MATERIAL	DIMENSION mm	SCALE N/S	TITLE CHASSIS ASSY	SHEET 10F1
THICKNESS				
FINISH	MODEL VT20+		DWG. NO. ASSY0290-01	VER. A
TOLERANCE UNLESS NOTE	DRAWN S.Y. OH	DATE 2010.08.18	 KIMANSON Kimanson Instruments CO., Ltd.	
DIMENSIONAL ±	CHECKED	DATE		
HOLE CENTERS ±	APPROVED	DATE		
DIAMETERS ±				
ANGULAR ±				


NO	DESCRIPTION	SPECIFICATION	Q'TY
1	CHASSIS ASS'Y	VT20+	1
2	SPEAKER	TSL200G0939	1
3	CABINET ASS'Y	VT20+(420X220X340 PB 15H)	1
4	HANDLE BAR	PVC	1
5	HANDLE EDGE	ZN DIECASTING Cr	2
6	BRAND MARK	VOX LARGE(SILVER)	1
7	VALVETRONIX	ABS BLACK + SILVER	1
8	VENT GRILL	ABS BLACK(SMALL)	2 </td
9	RUBBER FOOT	SBR SMALL	4
10	SCREW	MTS 4X20 BK	10
11	SCREW	MOS 4X20 NI	4
12	SCREW	TTLSK 4X30 BK	17
13	SCREW	TWLS 3.5X15 BK	4
14	FRANGE NUT	M4 NI	4



THIRD ANGLE PROJECTION



REV NO.	REV DATE	DESCRIPTIONS OF REVISION
C		
B		
A		

MATERIAL	DIMENSION mm	SCALE N/S	TITLE SET ASSY	SHEET 10F1
THICKNESS				
FINISH	MODEL VT20+		DWG. NO. ASSY0290-02	VER. A
TOLERANCE UNLESS NOTE	DRAWN S.Y. OH	DATE 2010.08.18	 KIMANSON Kimanson Instruments CO., Ltd.	
DIMENSIONAL ±	CHECKED	DATE		
HOLE CENTERS ±	APPROVED	DATE		
DIAMETERS ±				
ANGULAR ±				

VOX VT20+/40+/80+/120+ testing instruction

Nov 15, 2010 fushimi@korg.co.jp

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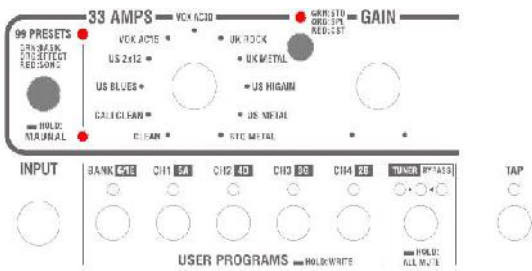
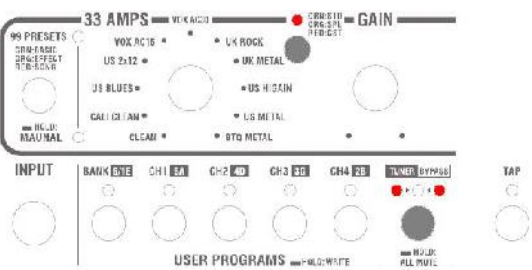
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2. Test mode

2.1. How to boot

Power on with switch indicated below being pushed to enter respective mode.

Release all switches after confirming the mode to be tested is correctly selected. Then enter the mode.



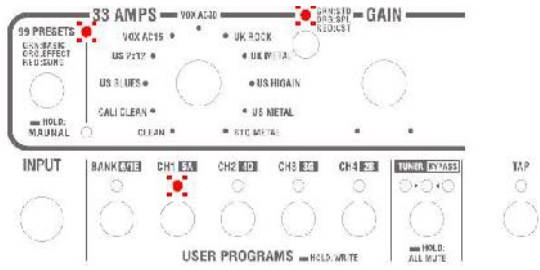
Modes	Switch to boot ( : lit,  : blink)
Internal test-> Control surface test.	
Audio test	

2.2. Internal test

In order to do switch test, connect VFS5 optional footswitch before boot the mode.

Item(s) below automatically will be inspected.

When NG occurred, LEDs lit/blink as below.

Test item	NG Indication ( : lit,  : blink)
CPU-DSP I/F	

Press PRESET SW and BANK SW together to check an NG item again after NG occurred.

Press PRESET SW and TUNER/BYPASS SW together to skip NG item and enter to next mode.

When internal test finished, mode shifts to control surface test mode automatically.



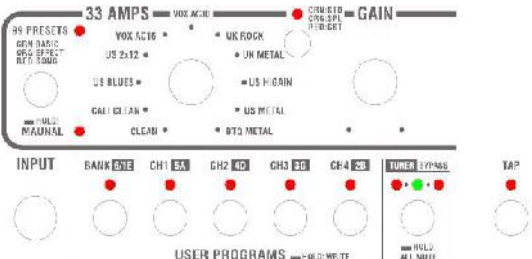
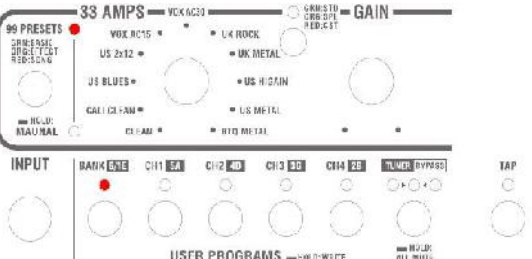
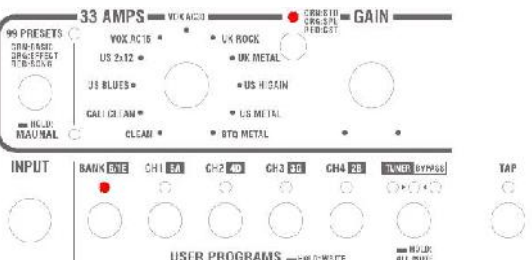
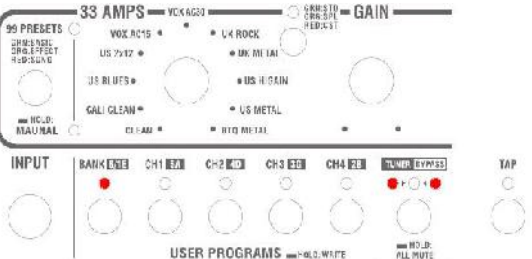
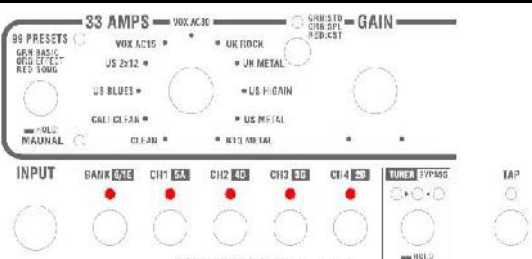
2.2.1. CPU-DSP I/F

CPU reads DSP register data to check wiring between CPU and DSP.

2.3. Control surface test

Control surface and indicators are checked as below order.

Audio loop will be tested along with PHONES jack switch in test item 4.

	Test item	Initial status ( :lit、  : blink)
1	Switch & LED	
2	11-clicks VR	
3	VR (non-click)	
4	PHONES Jack, Audio Loop	
5	Reload (DATA FLASH Initialization)	

---- Remarks ----

- In the initial status of switch & LED test, status of VFS5 is indicated on BANK, CH1~4 LED.
- Press BANK or TUNER SW when unit is initial status to choose each test mode.
- DSP will be muted except in test mode4.

2.3.1. Switch & LED

Check all LEDs are lighting (except green LEDs on PRESET, AMP, BANK)

Press TAP SW to check other switches and LEDs.

---- Remarks ----

- When BANK LED is blinking, BANK LED on VFS5 is green.
Then press BANK SW on VFS5 to make LED turn red.
- When either CH1,CH2,CH3,CH4 LEDs is blinking, CH SW on VFS5 is being pushed.
Release switches and make CH1~4 LEDs lit.

Check functions of all LEDs and switches in order.

1. Check LEDs in below chart lit correctly (others must not)
2. LED pattern change by pushing respective switch as below.

When all tests finished, enter to the next test automatically.

LED	Switch
PRESET (RED)	PRESET
PRESET (GREEN)	PRESET
MANUAL	PRESET
AMP (RED)	AMP
AMP (GREEN)	AMP
BANK (RED)	BANK
BANK (GREEN)	BANK
CH1	CH1
CH2	CH2
CH3	CH3
CH4	CH4
TUNER (LEFT)	TUNER/BYPASS
TUNER (GREEN)	TUNER/BYPASS
TUNER (RIGHT)	TUNER/BYPASS
TAP	TAP
BANK (RED), TAP	VFS5 BANK
BANK (GREEN), TAP	VFS5 BANK
CH1, TAP	VFS5 CH1
CH2, TAP	VFS5 CH2
CH3, TAP	VFS5 CH3
CH4, TAP	VFS5 CH4

---- Remarks ----

- All LED will blink when AMP TYPE knob turned during the test.
Press TAP switch to back to initial status of switch & LED test.

2.3.2. 11 - clicks VR

Check all click point on VR knob(w/click) as following order.

1. AMP TYPE (33 AMPS)
2. PEDAL TYPE
3. MOD/DELAY TYPE

Start test of knobs from their max position (rightmost).

If knob was set max initially, move the knob and set max again.

After checking min(leftmost) test on next knob starts automatically.

(Next test starts after MOD/DELAY test completed)

1. Stop knob at click point. (make sure knob is set on the point)
2. Go to next click after checking TUNER(GREEN) LED lit.

---- Remarks ----

- CH1~CH4 LED status changes according to A/D value of target knob(simple meter).
- If click point that was to be tested was skipped mistakenly before TUNER(GREEN) LED lit, TUNER(LEFT/RIGHT) LED will blink.
Back to the click point to be tested then LED will go out and test can be re-started.
- If A/D value of other knob varied accidentally, error occurs and test stops with PRESET, BANK LED blink.
Press TAP to cancel error status and re-start test.

2.3.3. VR (non - click)

Check A/D value of each VR (non-click)in the following order.

1. GAIN
2. VOLUME
3. TREBLE
4. MIDDLE
5. BASS
6. VALUE (PEDAL)
7. DEPTH (MOD/DELAY)
8. REVERB

Do test with each knob.

When all knob tests finished, next test starts automatically.

1. Turn knob to max (rightmost), (If knob was set max initially, move the knob and set max again).
2. Make sure TUNER(GREEN) LED lit.
3. Turn knob to MIN(leftmost), (when MIN is detected, TUNER(GREEN) LED turn off and goes to next step).

---- Remarks ----

- CH1~CH4 LED status changes according to A/D value of target knob(simple meter).
- If A/D value of other knob varied accidentally, error occurs and test stops with AMP, BANK LED blink.
Press TAP to cancel error status and re-start test.

2.3.4. PHONES Jack、Audio Loop

CPU checks PHONES jack status. Signal level back to input by sending 1kHz sine wave from DSP will be checked.

1. Set "MASTER" max.
2. Connect PHONES jack and INPUT jack via mono cable.
Check TAP LED lit when INPUT jack was connected to PHONES jack.
3. Press TAP switch (level check start).

When level check completed, next test will start automatically.

Output and input level (OK range) on each channel is a following.

(Each value corresponds to the one, when max signal input/output to/from DSP is set 1.0.

Test items	Output Ch (output level)	Input Ch (OK range)
DSP SI1R (Clean Ch)	DSP SO1L (0.015478)	DSP SI1R (0.35+-7dB)
DSP SI1L (Gain Ch)	DSP SO1L (0.001949)	DSP SI1L (0.35+-7dB)

----- Remarks -----

- When error occurs, PRESET, BANK, TUNER(LEFT/RIGHT) LED all blink and the test stops.
PRESET LED color indicated which channel is causing error.
(GREEN: Clean Ch, RED: Gain Ch).
- Press TAP switch to cancel error status and re-start test.

2.3.5. Reload (DATA FLASH Initialization)

Initialize all data such as USER PROGRAM and data on DATA FLASH.

Press TAP switch to start initialize. (BANK LED changes to green).

When initialize succeed, a unit will be goes to normal mode automatically.

----- Remarks -----

- When initialize failed, BANK, CH1-4 LED blink.
Press tap switch to back to first step of "Reload".

2.4. Audio test

This is a bypass mode to through INPUT signal and output directly.

DSP input channel can be switched by pressing PRESET switch.

Power amp mute On/Off(AMP_MUTE L/H) can be switched by pressing AMP switch.

Status of PHONES jack, VFS5 switch are shown on TAP LED, BANK,CH1-4 respectively.

Switch	Function	LED	Status
PRESET	DSP input L/R switch	PRESET=RED	L (Gain Ch)
		PRESET=GREEN	R (Clean Ch)
AMP	AMP_MUTE L/H switch	AMP=GREEN	High
		AMP=RED (Blink)	Low
PHONES Jack	PHONES jack status	TAP Off	Open (not connected)
		TAP On	Close (connected)
VFS5	VFS5 status	BANK=RED	BANK LED on VFS5 = RED
		BANK=GREEN	BANK LED on VFS5 = GREEN
		CH1 On	CH1 is pushed
		CH2 On	CH2 is pushed
		CH3 On	CH3 is pushed
		CH4 On	CH4 is pushed

Input mode	Load		Mesurement	Input Condition	Analyzer setting	Standard Value
Input	Phones 33ohm R	Normal CH (DSP R) LED:99Preset= G	Output Level	1k/-40dBm		-17dBm±3
			Output Level	14k/-40dBm	1k Relative	-3.0dB±3
			Output Level	50/-40dBm	1k Relative	-5.0dB±3
			Noise(MASTER=MAX)	GND	A filter,LPF=20k	≤-60dBm
			Noise(MASTER=MIN)	GND	A filter,LPF=20k	≤-70dBm
			Dist	1k/-40dBm	LPF=20k	≤5%
	Phones 33ohm L	Gain CH (DSP L) LED:99Preset= R	Output Level	1k/-58dBm		-17dBm±3
			Output Level	14k/-58dBm	1k Relative	-2.0dB±3
			Output Level	50/-58dBm	1k Relative	-5.5dB±3
			Noise	GND	A filter,LPF=20k	≤-60dBm
			DIST	1k/-58dBm	LPF=20k	≤5%
AUX/R	Phones 33ohm L	LED:99Preset=G	Output Level	15k/-10dBm		-8.0dB±3
			Output Level	50/-10dBm		-8.0dB±3
			DIST	1k/-10dBm	LPF=20k	≤1%
AUX/L		LED:99Preset=G	15k	15k/-10dBm		-8.0dBm±3
INPUT	4Ω SPEAKER	LED:99Preset=G	Hum Noise Rejection	GND	LPF=15k,Audio Filter	≥-38dBm and hearing check (Adjust Trim) Master Volume=0
Input	SP OUT 4Ω and <u>LPF</u>	Normal CH (DSP R) LED:99Preset= G	Output Level	1k/-40dBm		+7dB±3
			Output Level	10k/-40dBm	1k Relative	-1dB±3
			Output Level	50/-40dBm	1k Relative	-2dB±3
			VR Effect (<u>No Load</u>)	1k/-40dBm	1k Relative	+6.0dB±1.5
			Noise(MASTER=MAX)	GND	Audio filter,LPF=15k	≤-37dBm
			Noise(MASTER=MIN)	GND	Audio filter,LPF=15k	≤-38dBm
			Dist	1k/-26dBm	LPF=15k,Notch Filter=1k	≤5%
			Output Level(MAX OUT)	1k/-15dBm		≥22.2dBm(25W) Adjust Master Volume
			Dist(MAX OUT)	1k/-15dBm	LPF=15k,Notch Filter=1k	≤15% (Master Volume is same position)

KORG VT20+ Parts List

 = SAFETY CRITICAL COMPONENT.

EXP=EXPLODED VIEW Item No

Part Number	Category	Part Name	Location	EXP	Reference	QTY
530000001116	WAFER	WAFER LWL0640 3P	JACK PCB		CN4	1
530000000797	JACK	PHONE JACK EPJ-BBB-P(8) STEREO	JACK PCB		J4	1
530000001116	WAFER	WAFER LWL0640 3P	FOOT SW		CN4	1
530000000797	JACK	PHONE JACK EPJ-BBB-P(8) STEREO	FOOT SW		J4	1
500324022127	IC	TPA3110D2PWPR	MAIN		IC7	1
530000000194	OPAMP	IC NJU7082	MAIN		IC5	1
500324018020	DAC	AK4384ET-E2	MAIN		IC4	1
500324018021	ADC	AK5358AET-E2	MAIN		IC11	1
500320004748	IC	R5F21388AN101FP U1	MAIN		IC3	1
500320012334	DSP	MB87R1420PMC-G-BND	MAIN		IC14	1
530000000179	IC	IC 74LVU04DB	MAIN		IC2	1
530000001098	REGULATOR	UTC UR3325	MAIN		IC9	1
530000002307	REGULATOR	REGULATOR LM1117 5V	MAIN		IC6	1
530000001948	CHIP TR	KTC3295	MAIN		Q1	1
530000000277	CHIP TR	TR KTC3198GR	MAIN		Q9,Q10	2
530000000279	CHIP TR	TR KTC4075	MAIN		Q2,Q3	2
530000000275	CHIP TR	TR KTC2875	MAIN		Q4	1
530000000802	BEAD CORE	BEAD CORE FBS3550A0 .T	MAIN		FB2,FB9,FB10	3
530000002308	CHIP INDUCTOR	CHIP INDUCTOR HH-1M1608-121	MAIN		L1,L2,FB3	3
530000001380	CHIP INDUCTOR	HH-1M1608-600JT	MAIN		FB4,FB5,FB6,FB7,FB8, L17,L20,L21	8
530000002309	CRYSTAL	CRYSTAL 20MHz	MAIN		X1	1
530000002310	ZENER DIODE	ZENER DIODE 1N4744	MAIN		ZD2	1
530000002311	ZENER DIODE	ZENER DIODE E2Z11(3W 11V)	MAIN		ZD1	1
530000001103	LED	3O4HD-7	MAIN		LED11	1
530000000208	LED	LED RED 3M/M DLL-B5131Q	MAIN		LED4,LED5,LED6,LED7,LED8, LED9,LED10,LED13	8
530000002196	LED	DLL-B2131Q(G124)	MAIN		LED14	1
530000001102	LED	3RG9HW-2-A	MAIN		LED1,LED2,LED3	3
530000001225	LED SUPPORT	LED SUPPORT SW 4010 - 10MM	MAIN			9
530000001226	LED SUPPORT	LED SUPPORT SW 4009 - 9MM	MAIN			3
530000002312	BRIDGE DIODE	BRIDGE DIODE KBP306	MAIN		D7	1
530000002313	RESISTOR	METAL OXIDE RESISTOR 1W J 100	MAIN		R62,R126	2
530000002314	RESISTOR	METAL OXIDE RESISTOR 2W J 0.1	MAIN		R64	1
530000002315	RESISTOR	METAL OXIDE RESISTOR 2W J 12	MAIN		R22, R129	2
530000002316	RESISTOR	METAL OXIDE RESISTOR 2W J 180	MAIN		R46	1
530000002317	RESISTOR	CEMENT RESISTOR 5W J 47	MAIN		R205	1
530000002318	SEMI VOLUME	SEMI VOLUME KVSF689AC103 (10K)	MAIN		VR14	1
530000000288	VOLUME	VR RV160-40-15S-B10K-C0	MAIN		VR1,VR4,VR5,VR6,VR7, VR9,VR11,VR12,VR13	9
530000002319	VOLUME	VOLUME VR RV160-40-15S-B1K-C0	MAIN		VR2	1
530000000289	VOLUME	VR RV160-40-15S-B10K-C11 (11C)	MAIN		VR3,VR8,VR10	3
530000000265	TACK SWITCH	TACK SW ATS-1230B (K=9.5MM)	MAIN		SW1,SW2,SW3,SW4,SW5, SW6,SW7,SW8,SW9	9
530000001101	TUBE SOCKET	GZC9-A	MAIN		Q11	1
530000002320	STEREO JACK	STEREO JACK CKX3.5-69	MAIN		J2,J3	2
530000002321	HOUSING WIRE	HOUSING WIRE 3pin 320mm & 80mm	MAIN		CN2,CN3	1
530000002009	TERMINAL	AC4TVMINI TERMINAL 250T	MAIN		P6,P7	2
530000002010	TERMINAL	AC4TVMINI TERMINAL 187T	MAIN		TAG1,TAG2	2

530000002322	PCB ASS'Y	MAIN PCB ASS'Y VT20+	CHASSIS	1		1
530000002323	PCB ASS'Y	JACK PCB ASS'Y VT20+	CHASSIS	2		1
530000002324	PCB ASS'Y	FOOT S/W PCB ASS'Y VT20+	CHASSIS	3		1
530000002325	CHASSIS	MAIN CHASSIS(VT20)386X90X95	CHASSIS	4	CHA0333	1
530000002326	PANEL	FRONT PANEL(VT20) PVC 0.5t	CHASSIS	5	FPN0220	1
530000002327	PANEL	REAR PANEL PS 0.5t BLACK(100V)	CHASSIS	6	RPN0281	1
530000002328	PANEL	REAR PANEL PS 0.5t BLACK(120V)				
530000002329	PANEL	REAR PANEL PS 0.5t BLACK(230V)				
530000002330	PANEL	REAR PANEL PS 0.5t BLACK(240V)				
530000001126	KNOB	VOLUME KNOB CHIKEN HEAD CREAM	CHASSIS	7		8
530000001127	KNOB	ROUND KNOB	CHASSIS	8	KNOB0050	5
530000001124	KNOB	TACT KNOB "A" NBR 9PIE	CHASSIS	9	KNOB0047	8
530000001125	KNOB	TACT KNOB "B" NBR 7PIE	CHASSIS	10	KNOB0048	1
510465500501	TUBE	TUBE(VALVE)12AX7AC5HG	CHASSIS	14		1
530000001117	TUBE RETAINER	TUBE RETAINER	CHASSIS	15	SPR0012	1
530000002331	⚠ TRANS	TRANS 100V = 066-VT20+J	CHASSIS	21		1
530000002332	⚠ TRANS	TRANS 120V = 066-VT20+U				
530000002333	⚠ TRANS	TRANS 220-230V = 066-VT20+E				
530000002334	⚠ TRANS	TRANS 240V = 066-VT20+EF				
530000000761	⚠ SWITCH	POWER SW RL3-421	CHASSIS	22		1
530000000199	⚠ INLET	INLET/FUSE HOLDER SC-8F-21	CHASSIS	23		1
530000000806	⚠ FUSE	FUSE T1A L 250V	CHASSIS	24	100V=T1A L 250V 120V=T1A L 250V	1
530000000167	⚠ FUSE	FUSE T500MA L 250V			230V=T500mA L 250V 240V=T500mA L 250V	
530000002335	⚠ ASSY	CHASSIS ASS'Y VT20+(100V)	SET	1		1
530000002336	⚠ ASSY	CHASSIS ASS'Y VT20+(120V)				0
530000002337	⚠ ASSY	CHASSIS ASS'Y VT20+(230V)				0
530000002338	⚠ ASSY	CHASSIS ASS'Y VT20+(240V)				0
530000002339	⚠ SPEAKER	SPEAKER TSL200G0939	SET	2		1
530000002340	⚠ ASSY	CABINET ASS'Y (VT20)	SET	3	CAB0366	1
530000000313	⚠ HANDLE	HANDLE ASS'Y	SET	4,5		1
530000000138		BRAND MARK VOX (LARGE) SILVER	SET	6		1
530000000854		BRAND MARK VALVETRONICS SILVER	SET	7		1
530000000767		VENT GRILL	SET	8		2
530000000252		RUBBER FOOT SBR SMALL	SET	9		4
500600006508	⚠	LY100JPVCTFLY35LY37(JP)				1
530000000123	⚠	AC CORD 120V = KKP30-16A				
530000000124	⚠	AC CORD 230V = KKP4819R-16A				
530000000125	⚠	AC CORD 230V = KKP650-16A				
530000000126	⚠	AC CORD 240V = KKP550-16A				
530000002342		VT20+ BAFFLE ASS'Y				